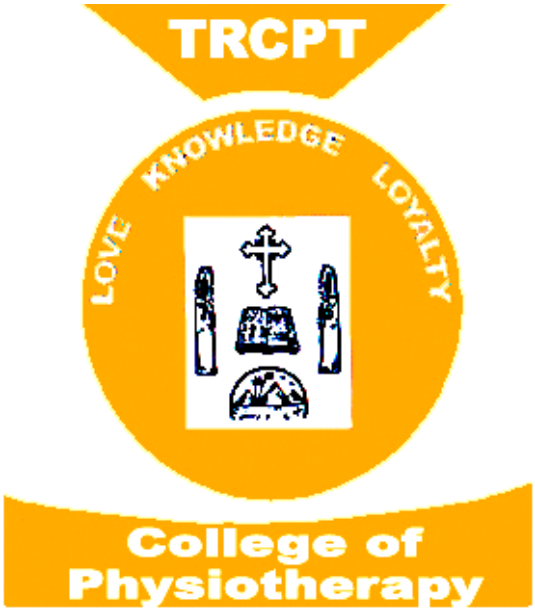
"A STUDY TO ANALYZE THE EFFETIVENESS OF AUGMENTED EXERCISE THERAPY TIME ON GAIT PARAMETERS IN PATIENTES WITH MODERATE STROKE"



DISSERTATION SUBMITTED TO

THE TAMILNADU DR M G R MEDICAL UNIVERSITY, CHENNAI.

TOWARDS PARTIAL FULFILLMENT AS A REQUIREMENT FOR

THE DEGREE

MASTER OF PHYSIOTHERAPY

April 2011

Certificate

This is to certify that the research work entitled

A STUDY TO ANALYZE THE EFFETIVENESS OF AUGMENTED EXERCISE THERAPY TIME ON GAIT PARAMETERS IN PATIENTES WITH MODERATE STROKE

Was carried out by the candidate with the (Reg.No. 27092908) Master of Physiotherapy student, at ***Thanthai Roever College of Physiotherapy***, submitted to The TamilNadu Dr. MGR Medical University, Chennai towards the partial fulfilment as a requirement for the degree Master of Physiotherapy (MPT-Neurology).

Prof. Fredrick John, MPT.,MIAP

Place: Perambalur

Principal

Date:

Thanthai Roever College of Physiotherapy

Perambalur 621212.

Certificate

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Was carried out by the candidate with the ***(Reg.No.*** 27092908***) Thanthai Roever College of Physiotherapy,*** under the guidance of me, towards the partial fulfilment as a requirement for the degree Master of Physiotherapy submitted to the Tamil Nadu Dr. MGR Medical University, Chennai.

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Date: Guide

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Examiners:

1.

2.

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CONTENTS

ABSTRACT

Aim of the study:

To study the effectiveness of the Augmented exercise therapy time in improving gait parameters in moderate stroke patients.

OBJECTIVES:

►To know the spatio-temporal gait parameter in patients with moderate stroke.

►To know the effect of augmented exercise therapy time in improving gait parameters in moderate stroke patients.

►To know the difference between the effectiveness of augmented exercise therapy time program and formal exercise therapy time program in moderate stroke patients.

STUDY DESIGN

Two group pre test post test experimental study design.

Study method:

Purposive sampling technique was used . Thirty samples are equally divided into group A and group B.

Group A was treated with Augmented exercise therapy time along with formal exercise therapy time.

Group B was treated with formal exercise therapy time program.

Measurement fool:

Cadence

Velocity

Result:

Statistical analysis done by using paired t-test showed that there is improvement in gait parameters in group A an group B. Independent t-test using post test values between group A and group B showed improvement in group A than group B.

Conclusion:

Results from the study showed Augmented exercise therapy time is superior to formal exercise therapy time program for patients with moderate stroke patients.

I.INTRODUCTION

The term cerebro vascular disease or stroke designates any abnormality of the brain resulting from a pathogenic process of the blood vessels and also defined by WHO as “rapidly developed clinical signs of focal (or global) disturbances of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.

Stroke is the third leading cause of death in India after heart disease and cancer. Among all neurological diseases the cerebro vascular disease clearly ranks first in frequency and importance (Raymond D.Adams 1997). Prevalence rate approximately 1 in 59 or 1.69%. The American heart association estimate 600,000 strokes annually. 500,000 cases new cases and 100,000 recurrence cases (neurology Asia 2006).The incidence increases dramatically with age doubling in every decade after 65 years of age. The prevalence of stroke in India was estimated as 203 per 100,000 populations above 20 years, amounting to a total of about 1 million cases. Around 12% of all stroke occurred in population below 40 years.

The incidence of stroke increases exponentially from 30 years of age. 95% of stroke occurs in people age 45 and older, and two thirds of strokes in those over the age of 65. Men are 25% more likely to suffer than women (terent A C 1997).There are two main groups of stroke as ischemic and haemorrhagic stroke. Most common ischemic stroke is thrombotic and embolic stroke. The MCA vessel is the most commonly affected in ischemic stroke (Schwartz 1985). 80% of middle cerebral artery stroke occurs in carotid arterial distribution.

In persons with stroke, posture tone and coordinate reciprocal movements which are required for normal gait are usually impaired. Normal reciprocal pelvic movement is often replaced by a fixed pelvic retraction, which makes it difficult for patients to swing the affected lower extremity forward. The resultant gait is slow, with a short step length and asymmetric steps often called hemiplegic gait and this slow gait can be observed in clinical settings as a decrease in gait speed and cadence. Improvement of the quality of gait is often a major goal of physical therapy for patients with hemiplegia.

Human brain is capable of significant recovery after stroke, provided that the correct treatment and stimuli are applied in adequate amounts and at the right time.

One major component of stroke rehabilitation is exercise therapy to minimize the effects of brain cell damage and optimize relearning. It is well recognized that for cortical re- organization to occur post stroke ,there is requirement for high levels of repetition and tasks and exercises that are both challenging and engaging.

Exercise therapy was defined as motion of the body or its parts to relieve symptoms or to improve function, leading to physical fitness.

`Augmented exercise therapy` refers to the amount in minutes of exercise therapy that people with stroked received that was in excess of their routine exercise intervention.

This study was conducted to find out the efficacy of Augmented exercise therapy time on gait parameters in patients with moderate stroke.

1.1 NEED FOR THE STUDY:

Stroke is the second leading contributor to years of life due to disability in the disability in the developed world. The activity most affected by stroke is walking with as many as so% initial losing this ability.Walking ability rapidly improves in the first 5 weeks following a stroke and recovery may continue beyond 3 and even 6months.however, the recovery of walking ability is incomplete for many. Therefore gait re-education is an important physical therapy intervention for patients following stroke. Gait speed is lower than normal in stroke subjects. Elements of walking competency include walking at adequate speeds to cross the street safely, walking distance necessary to accomplish the a\basic and instrumental activities of daily living and maintaining balance which is not an isolated quality, but which is required to perform wide range of activities constituting normal daily activities of life.

Improvement in parameter of gait is stressed in this study with the use of Augmented exercise therapy time program in stroke patients.

1.2 STATEMENT OF THE PROBLEM:

An experimental study to assess the effectiveness effect of augmented exercise therapy time in improving gait parameters in patients with moderate stroke.

1.3 KEY WORDS:

Stroke, augmented exercise therapy, Gait parameters, Gait.

1.4 OBJECTIVES:

► To know the spatio-temporal gait parameter in patients with moderate stroke.

► To know the effect of augmented exercise therapy time in improving gait parameters in moderate stroke patients.

► To know the difference between the effectiveness of augmented exercise therapy time program and formal exercise therapy time program in moderate stroke patients.

1.5 HYPOTHESES:

NULL HYPOTHESIS :

There is no significant improvement in spatio-temporal parameter of gait following augmented exercise therapy time in patients with moderate stroke.

ALTERNATE HYPOTHESIS :

There is a significant improvement in gait parameters following augmented exercise therapy time in patients with moderate stroke.

II.REVIEW OF LITERATURE

1. Carr,Shepard et all , 1985

"Positioning the hemiplegic arm in functional position with sand bags or available materials is very therapy to prevent contracture formation.

2. **Sunderland A et al (1992)**

"with enhanced exercise therapy recovery of strength, range and speed of movement can be achieved"

3. Kalra L and Crome P, (1993)

"The Orpington score when assessed at two weeks post stroke is a useful prognostic indicator with special suitability for the elderly and may help to select patient most likely to benefit from stroke unit"

4. Goldie et al., (1996)

"Gait velocity improved following conventional exercise program"

5. Suzuki K et al, (1999)

"The maximum walking speed for 10m was significantly gained from 32.3 to 53.2m/min on average following conventional gait training program and the stride length and walking rate also rise"

6. Gereon Nellas et al (1999)

"Areas in brain play an important role n the reorganization of sensory and motor system for preceding restoration of neurological function."

7. Kenneth H C et al., (2000)

"The locomotor training shows greatest gains in gait velocity, temporal measures and improves functional mobility in individuals with hemiparetic stroke"

8. Carol L. Richards et al., (2001)

"The walking speed and cadence has been successful in assessing the gait performance of stroke patients because of its high validity"

***9.* Salbach NM and Mayo NE, (2001)**

"Based on the available evidence, the walking velocity is recommended highly as a clinical and research tool for evaluating the changes gait speed following acute stroke"

10. Johanna H Vander Lee et al (2001)

" More exercise therapy may be beneficial for stroke patients"

11. Kwakkel and Robert C Wagenaar ,(2002)

"Walking speed is used an outcome measure for gait performance in stroke rehabilitation"

12. Jaffe D C. et al., (2004)

"Gait velocity and cadence provide a discriminative measure for evaluating outcome in stroke rehabilitation"

13. Boudewijin kollen et al., (2005)

"The repeated comfortable walking speed measurements are sensitive enough to detect changes in physically independent gait in people who are severely affected by stroke"

14. Yea-Ru Yang et al., (2005)

"Asymmetric gait pattern in patients post stroke could be improved from receiving additional backward walking therapy along with conventional treatment program"

15. Sullivan K, et al., (2006)

"Gait velocity showed acceptable distribution, high internal consistency, high concurrent validity and high responsiveness and could provide useful information in selection of gait training measures for both clinician and researches"

16. Yang et al., (2007)

"The gait parameters such as cadence and walking speed showed significant improvement in measuring walking ability in subjects with moderate stroke"

17. Ruth Dickstein, DSC (2008)

"The most widely accepted criteria for measuring the gain in speed of walking in stroke rehabilitation is walking speed"

18. Rose Galvine (2008)

"Additional, focused exercise on the lower extremity has a favorable effect on lower extremity impairment an walking speed."

19. Joseph Hidler et al., (2009)

"For sub acute stroke participants with moderate to severe gait impairments, the diversity of conventional gait training appears to be more effective for facilitating returns in walking ability"

20. Feys et al, (2010)

"Participants who demonstrated severe motor deficits had a more marked improvement following addition exercise therapy"

III. METHODOLOGY

3.1. STUDY DESIGN:

Two group pre test post test experimental study design.

3.2. STUDY SETTING:

This study was conducted at

- Retna Global Hospital,Trichy
- Thanthai Roever Physiotherapy outpatient department,Perambalur.

3.3. STUDY DURATION :

One year

3.4. SAMPLES :

A total of 30 patients who fulfilled selection criteria were selected by convenient sampling method and they were divided into two groups as 15 subjects in each group.

3.5. CRITERIA FOR SELECTION :

INCLUSION CRITERIA :

- Age group between 40 – 60 years.
- Both sexes are included.
- Patients with any side of involvement.
- Patients with moderate stroke.
- Ability to walk at least 60 feet without manual assistance with or without an assistive device at ones preferential speed.
- Moderate stroke patients using Orpingtonprognostic scale.
- Moderate stroke involved middle cerebral artery.

EXCLUSIVE CRITERIA :

- Patients with ischemic heart disease.

- ► Patients with seizure disorders.
- ► Patients with Circulatory Compromise.
- ► Patients with severe musculoskeletal disorders.
- ► Patients with dementia.
- ► Patients with dorsal column problems.
- ► Patients participating any other clinical triads.

3.6. MATERIALS USED :

- ► Stop watch .
- ► Inch tape.
- ► Marker.
- ► Chalk.
- ► Chalk powder.

3.7. MEASUREMENT TOOLS :

- ► Cadence

Cadence is the number of steps in a given time i.e steps /min. In normal walking each person adopts his own cadence and he will change only when he changes speed. When his walking speed increases or decreases, his cadence increases or decreases correspondingly.

- ► Gait velocity.

Walking velocity is step length x cadence or stride length /2 x cadence measured in distance travelled per time, ueually meters per minute. A stop watch was used to measure the time taken to cover the distance of 10m.

3.8. PROCEDURE :

Based on inclusion and exclusion criteria , 30 subjects will be selected and they will undergo pretest assessment. They were divided into

two groups – Group A and Group B with 15 subjects in each group. The pretest values of fait parameters such as cadence and velocity were recorded.

GROUP A :

Patients will undergo formal exercise therapy with augmented exercise therapy time program of sixty minutes per session.

GROUP B :

Patients will undergo formal exercise therapy time program of thrity minutes per session.

The study duration for individual patient will be about 8 weeks as 5 days per week.

At the end of 8 weeks treatment program, subjects will undergo post-test assessment.

EXERCISES GIVEN to GROUP A and GROUP B

CONVENTIONAL MANAGEMENT PROGRAM

Duration of Exercise :

Exercise given per session per day for a period of eight weeks (five days per week)

Group A: 30 minutes **Group B: 60 minutes**

Upper Limb

In Lying

Small circles in the air with the elbow extended

Touching the head up and again

Flexion and extension of the elbow with the hand in dorsiflexion

Holding a pole in both hands, lowering and raising it

Protective extension in sideway1

In Sitting

Holding the towel in the affected arm

Holding rolled towel, vertically walk hand upward

Place hand flat against therapist's hand and move without resistance

In Standing

Weight – bearing through the extended arms

Weight bearing on the affected arm while rotating the trunk away

Hands flat on the wall – lift sound leg

Lower Limb

In Lying

Hip and knee flexion over the side of the bed

Knee extension with dorsiflexion

Hip control with the foot on the bed

Isolated knee extension

In Sitting

Independent movement of the legs

Raising the hip in sitting with the legs crossed

Moving in sitting with the feet on the floor

In Standing

Balance Training

Standing on a wobble board

Standing and catching a ball

Gait training

Weight-bearing on the affected leg

(Preparation for the stance phase of gait)

Placing the sound leg on the step

Stepping out to the side with the sound leg

Making a figure of eight with the sound leg

Placing the sound foot at right angles to the hemiplegic foot

Stepping up with the affected leg on the step

Putting the sound leg, further and further back

With the affected leg on the step, step up and over

Releasing the knee and moving the hemiplegic leg

(Preparation for the swing phase of gait)

Releasing the hemiplegic leg in standing

Releasing the knee with the hemiplegic leg behind

Taking small steps backward with the affected leg

Walking sideways behind a line

Climbing stairs assisting the affected leg up

Climbing stairs supporting the affected knee to step up

Descending stairs –hand supporting the affected knee

3.9. STATISTICAL TOOLS

To compare pre test – post test value of Group A and pre test post test value of Group B, dependent‘t’ test is used.

(i)Dependent 't'test

$$t = \frac{\bar{d}\sqrt{n}}{SD}$$

$$SD = \sqrt{\frac{\sum d^2 - n\left(\bar{d}\right)^2}{n-1}}$$

Where,

n = Total number of subjects

SD = Standard deviation

d = Difference between initial and final value

$\bar{d}$ = Mean difference between initial and final value.

(ii) Independent't' test:

To compare the pre-pre and post-post values of Group A and Group B, independent't' test is used.

$$\frac{\bar{x}_1 - \bar{x}_2}{s}\sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

$$s = \sqrt{\frac{(n_1 - 1){s_1}^2 + (n_2 - 1){s_2}^2}{n_1 + n_2 - 2}}$$

$$s_1 = \sqrt{\frac{\sum {x_1}^2 - n_1\left(\bar{x}_1\right)^2}{n_1 - 1}}$$

$$s_2 = \sqrt{\frac{\sum {x_2}^2 - n_2\left(\bar{x}_2\right)^2}{n_2 - 1}}$$

Where,

n_1 = Number of subjects in Group A.

n_2 = Number of subjects in Group B.

$\bar{x}_1$ = Mean of Group A

$\bar{x}_2$ = Mean of Group B

s_1 = Standard deviation of Group A.

s_2 = Standard deviation of Group B.

S = Combined standard deviation

IV. DATA ANALYSIS AND INTERPRETATION

GAIT VELOCITY

Comparison of before and after gait velocity in Group A

Table -I

Gait velocity scores	Mean	SD	Mean diff	Paired t-value	P value
Before	12.1827	1.3033	3.9713	28.0663	<0.0001
After	16.1540	1.1333			

Figure-I

Comparison of before and after gait velocity in Group B

Table -II

Gait velocity scores	Mean	SD	Mean diff	Paired t-value	P value
Before	12.1520	1.4607	2.2900	9.8481	<0.0001
After	14.4420	1.3860			

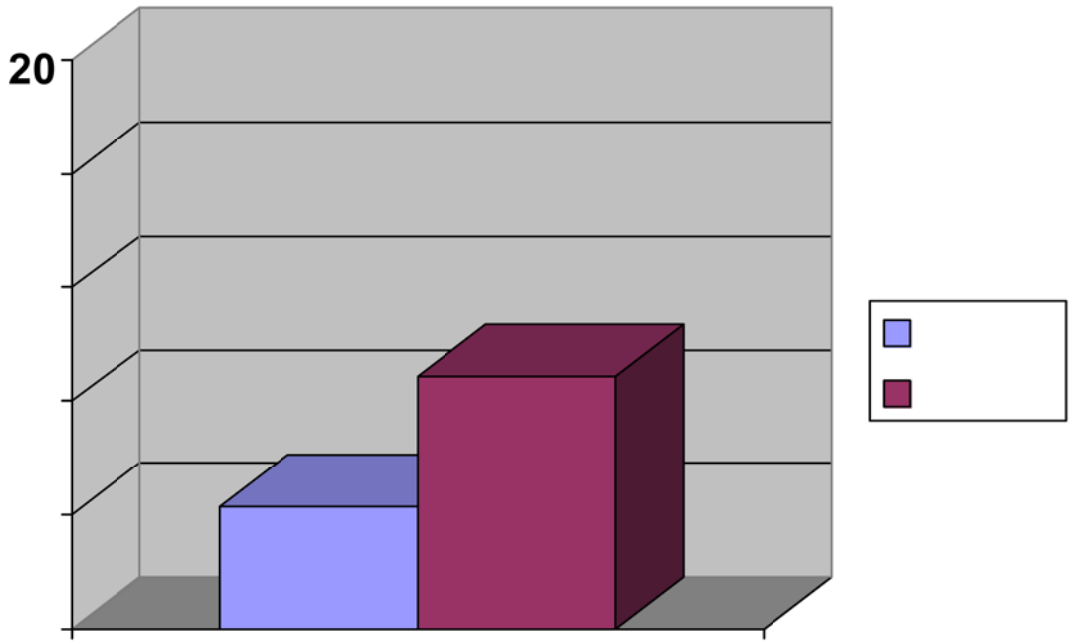


Figure-II

Comparison of before and after gait velocity in Group A and Group B

Table –III

GAIT VELOCITY SCORE	Pre-test Day -1 gait velocity Mean	Standard deviation of pre-test values	Independent 't' test value t = 1.701	Post test Day - 40 mean score	Standard deviation of post-test values	Independent 't' test value t = 1.701	Dependent 't' test value t =1.761	Rate of progression
Group A	12.1827	1.3033	0.1958	16.1540	1.1333	3.7035	28.0663	32.59%
Group B	12.0853	1.4169		14.4420	1.3860		9.8481	19.5%

Table shows statistical results of gait velocity in group A and group B.

Figure-III

Gait velocity

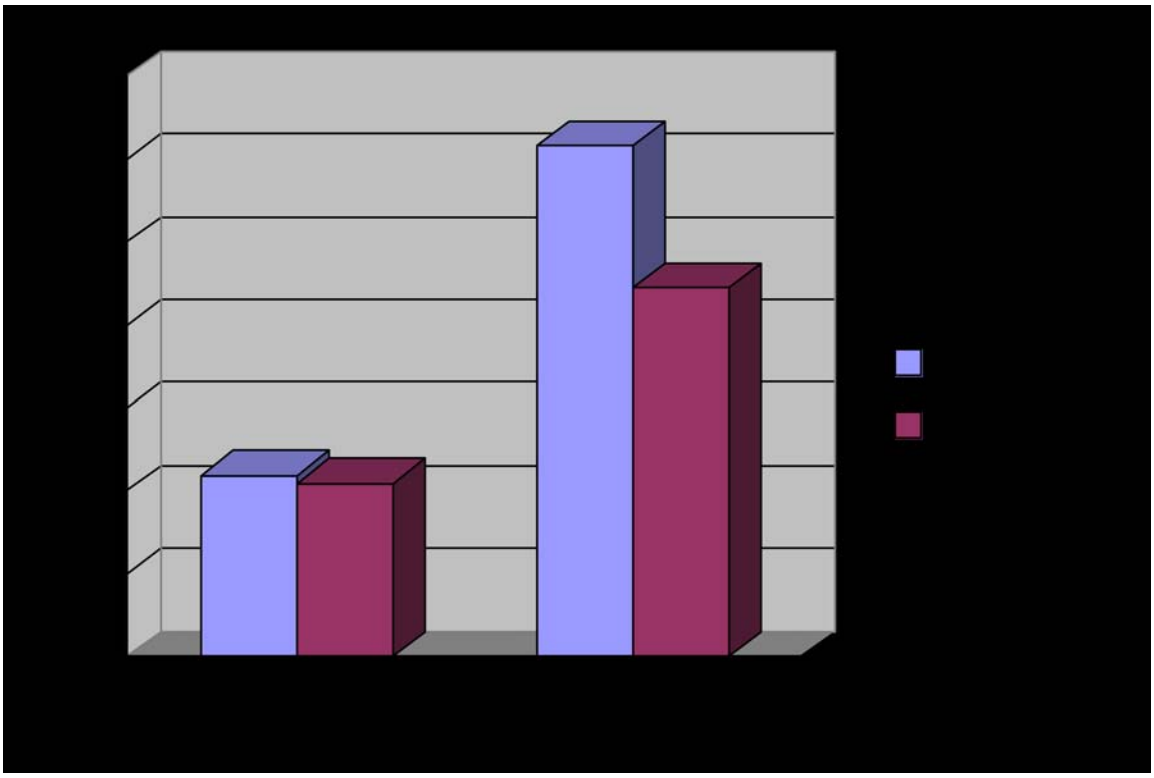


Figure shows the day 1 and day 40 values of group A and group B

ANALYSIS OF RESULTS

Using Independent‘t’ Test.

a) Comparing pre test Gait Velocity scores of group A and group B

Calculated‘t’ value (0.1958) is less than table value (1.701) at 5% level of significant for one-tailed ‘t’ test showing that there is no significant difference between two groups.

b) Comparing post test Gait Velocity scores of group A and group B:

Calculated‘t’ value (3.7035) is greater than table value (1.701) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two groups.

Using Dependent‘t’ Test

a) Comparing pre test and post test values of Gait Velocity score in Group A.

Calculated ‘t’ value (28.0663) is greater than the table value (1.761) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two values.

b) Comparing pre test and post test values of group B of Gait Velocity score values.

Calculated ‘t’ value (9.8481) is greater than the table value (1.761) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two values.

Using rate of progression:

The rate of progression for group A is 32.59% and for group B is 19.5%.

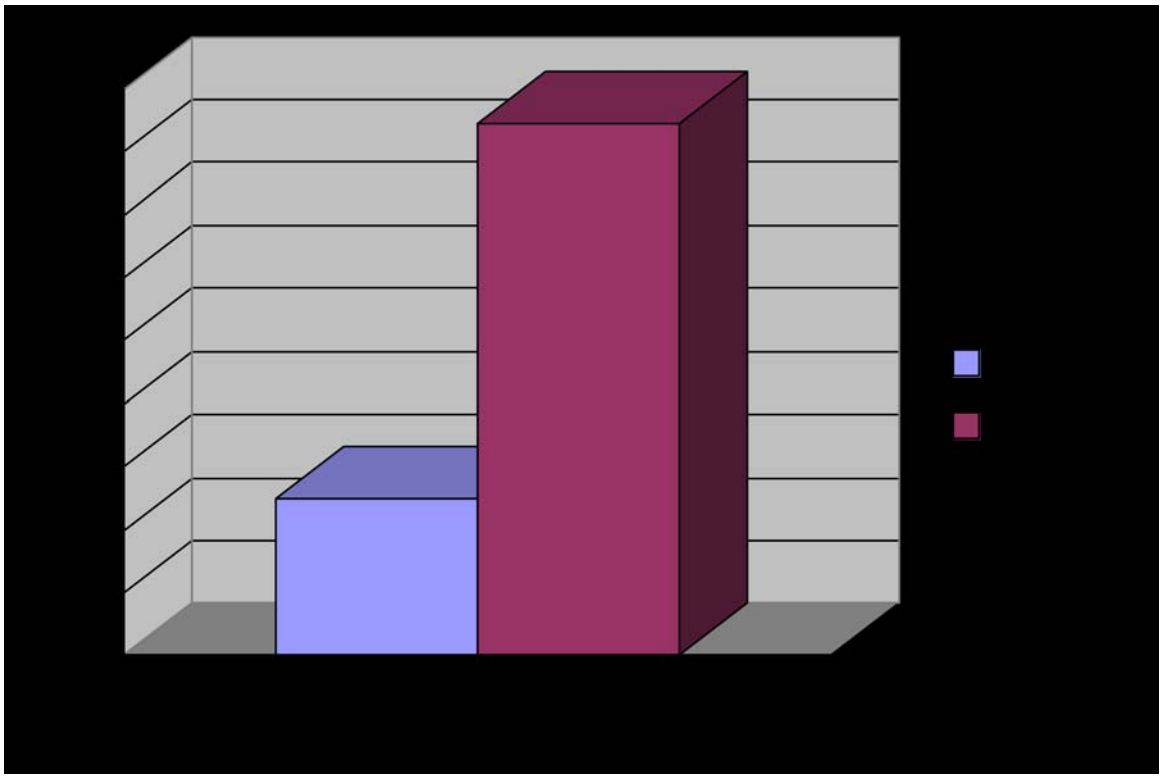
CADENCE

Comparison of before and after cadence scores in Group A

Table -I

cadence scores	Mean	SD	Mean diff	Paired t-value	P value
Before	55	6.45	-11.87	17.3947	<0.0001
After	66.87	5.62			

Figure-III



Comparison of before and after cadence scores in Group B

Table -II

cadence scores	Mean	SD	Mean diff	Paired t-value	P value
Before	55.93	6.92	7.40	10.5357	<0.0001
After	63.33	4.98			

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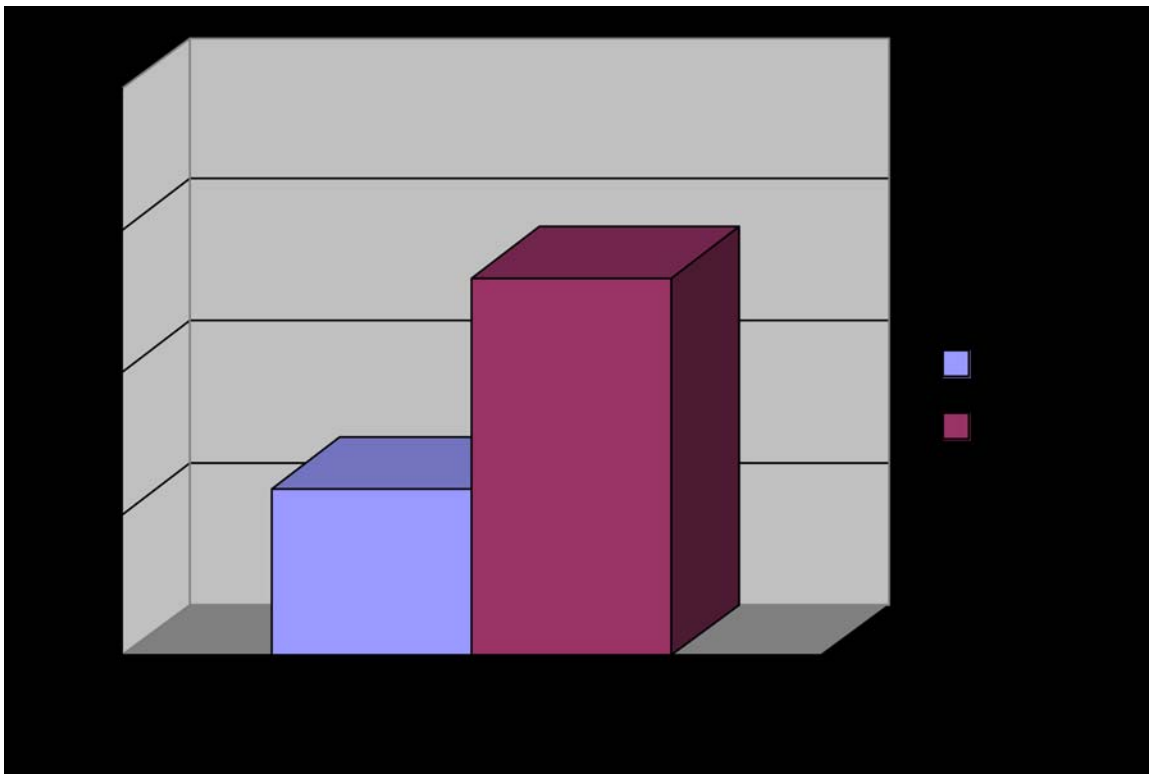
Figure-III



Comparison of before and after cadence scores in Group A and Group B

Table -III

CADENCE SCORE	Pre-test Day -1 cadence Mean	Standard deviation of pre-test values	Independent 't' test value t = 1.701	Post test Day -40 mean score	Standard deviation of post-test values	Independent 't' test value t = 1.701	Dependent 't' test value t =1.761	Rate of progression
Group A	55	6.45	0.3821	66.87	5.62	1.8228	17.394	17.39%
Group B	55.93	6.92		63.33	4.98		10.535	13.23%

Table shows statistical results of cadence in group A and group B.

Figure-II

Cadence

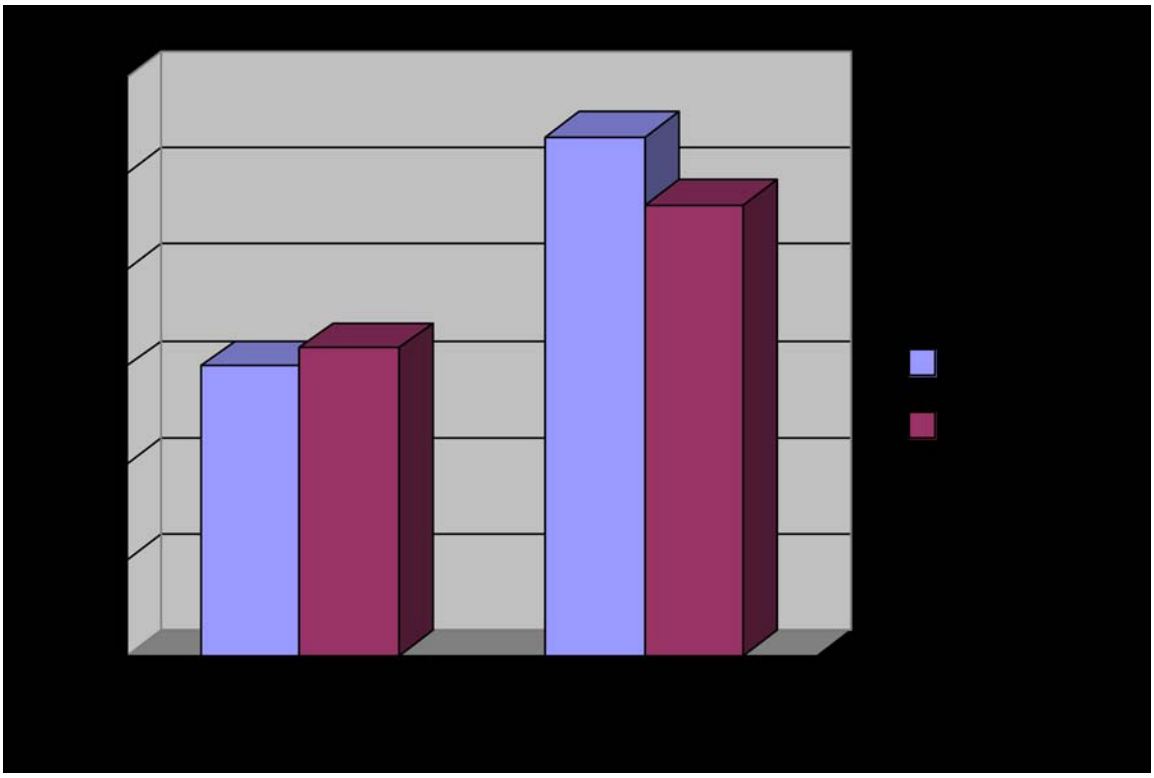


Figure shows the day 1 and day 40 values of group A and group B

ANALYSIS OF RESULTS

Using Independent‘t’ Test.

a) Comparing pre test Cadence score values of group A and group B

Calculated‘t’ value (0.3821) is less than table value (1.701) at 5% level of significant for one tailed ‘t’ test showing that there is no significant difference between two groups.

b) Comparing post test Cadence score values of group A and group B:

Calculated‘t’ value (1.8228) is greater than table value (1.701) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two groups.

Using Dependent‘t’ Test

a) Comparing pre test and post test values of group A of Cadence score values.

Calculated ‘t’ value (17.394) is greater than the table value (1.761) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two values.

b) Comparing pre test and post test values of group B of Cadence score values.

Calculated ‘t’ value (10.535) is greater than the table value (1.761) at 5% level of significance for one tailed ‘t’ test showing that there is significant difference between two values.

Using rate of progression:

The rate of progression for group A is 17.39% and for group B is 13.23%.

V.DISCUSSION

This is an experimental study to find out the effectiveness of augmented exercise therapy time program on gait velocity and cadence in moderate stroke patients. This study was conducted on 30 patients,where 15 patients were allocated into experimental group who were given augmented exercise time of therapy for 60 minutes. In the other group 15 patients were allocated and were given formal exercise therapy for 30 minutes. The result of this study indicates that there is no significant difference between the mean pre test values in gait velocity and cadence. This shows that the subjects from the both groups are unmatched groups of subjects undergoing different exercise program, but they were selected from same population.

Analysis of post test means in group A and B shows that there is significant difference between the two groups. Moreover, the analysis of the rate of progression shows that there is 32.59% improvement in group A and 19.5% improvement in group B for gait velocity. When we consider the cadence, the rate of progression for group A 17.39% and for group B 13.23% improvement in group B. Thus the analysis of rate of progression shows that there is significant improvement in group A than group B. This shows superiority of Augmented exercise therapy time program on gait velocity and cadence than formal therapy time program

Thus the null hypothesis of this study can be rejected and the experimental hypothesis stating that there is significant difference in gait parameters in hemiplegics using additional therapy time was accepted.

The findings of this study are similar to those of kwakkel et al(2004) who also demonstrated that increased time spent in exercise training in the first 6 months after stroke results in favourable improvement in gait parameters. In stroke patients normal reciprocal pelvic movement is often replaced by a fixed pelvic retraction, which makes it difficult for patients to swing the affected lower extremity forward. The resultant gait is slow, with a short step length and asymmetric steps. This slow gait can be observed in clinical settings as a decrease in gait speed and cadence.

This might be the reason why group A subjects have got marked improvement in gait velocity and cadence than .group B.

VI.CONCLUSION

Both and augmented exercise time program and formal time program give significant improvement on gait velocity and cadence in moderate stroke patients. But there is marked improvement in gait velocity and cadence following augmented exercise time program.

Thus augmented exercise therapy time program is feasible, simple and risk free and this can be used to treat the various neurologically affected populations.

VII.LIMITATIONS AND RECOMMENDATIONS

- This study was done in hemiplegic subjects especially for the lower limb muscles spasticity and so the study could not validate its role in the Upper limb spastic muscles.
- This study was done only with the age group ranging from 40-60years, other age groups were not considered.
- Only two parameters of the gait were included in the study to assess the improvement in the gait of the hemiplegic subjects; other parameters such as step length, base of support etc were not included.
- The study quantified only gait parameters, further study must include other components such as trunk control, arm function, hand function to further validate the results of the study.
- Prognostic difference due to variations in age, medication, climatic condition and psychological studies were not able to control.
- Intra and inter rater reliability can be done in each pre test assessment phase there by to get more reliable measures.
- It would be interesting to assess how long improvement would be maintained by adding a delayed post test.
- This treatment can be applied in other type of neurological impairments like spinal cord lesion and cerebral palsy.
- More research should be done on older ages to see how they fare by this treatment.
- It is recommended that further studies can be performed for other varieties of cerebro vascular accident.

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IX.APPENDIX -I

PATIENT'S PROFILE

Name: Age:

Sex:

Occupation:

Date of admission:

Chief complaints: Date of assessment:

Past medical history:

Present medical history:

Personal and family history:

Associated problems:

Vital signs:

Temp: Pulse: Resp. Rate:

B.P:

On observation

Built:

Posture:

External Appliances:

Deformities:

Skin changes:

On Examination

Higher functions:

Level of consciousness:

Orientation:

Memory:

Vision:

Speech:

Hearing:

Cranial Nerve Examination:

Sensory Examination:

Superficial sensation:

Deep sensation:

Cortical sensation:

Motor Assessment:

Tone:

Reflexes:

Superficial reflex:

Deep tendon reflex:

Voluntary control:

Range of motion:

Co-ordination:

Balance reactions:

Gait:

Hand function:

Activities of daily living:

Diagnosis:

Problem list:

Aims:

Means:

APPENDIX -II

ORPINGTON PROGNOSTIC SCALE

a. Motor deficit in arm

Lying supine, patient flexes shoulder to 90º and is given resistance.

0 MRC grade 5

0.4 MRC grade 4

0.8 MRC grade 3

1.2 MRC grade 1-2

1.6 MRC grade 0

b. Proprioception (eyes closed)

Locates affected thumb

0 Accurately

0.4 Slightly difficulty

0.8 Finds thumb via arm

1.2 Unable to find thumb

c. Balance

0 Walks 10 feet without help

0.4 Maintains standing position

(Unsupported for 1 minute)

0.8 Maintains sitting position

1.2 No sitting position

d. Cognition

1. Age of patient
2. Time

3. Name of hospital
4. Year
5. Date of birth
6. Number
7. Place
8. Name of chief minister
9. Count backward (20-1)

0	Mental scores of 9
0.4	Mental scores of 8
0.8	Mental scores of 5-7
1.2	Mental scores of 0-4

Total score=1.6+Motor+Proprioception + Balance + Cognition _____

Based on the following

1	Minor <3.2
2	Moderate = 3.2 – 5.2
3	Major >5.2

APPENDIX-III

CONSENT FORM

This is to certify that I ……. freely and voluntarily agree to participate in the study "**AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF AUGMENTED EXERCISE THERAPY**

TIME ON GAIT PARAMETERS IN PATIENTS WITH MODERATE STROKE".

I have been explained about the procedures and the risks that would occur during the study. Questions have been answered to my satisfaction.

Participant:

Witness :

Date :

I have explained and defined the procedure to which the subject has consented to participate.

Researcher:

Date

Master Chart

Group A (Experimental Group)

Sl.No	Name	Age	Sex	Cadence before	Cadence after	Gait velocity before	Gait velocity after
				In steps	In steps	In meter / min	In meter / min
1	Mr. Pattu	47	M	64	76	13.42	17.02
2	Mrs. Angammal	60	F	50	62	12.76	16.52
3	Mr. Raja	48	M	48	58	10.4	15.48
4	Mrs. Lakshmi	54	F	62	70	11.86	16.62
5	Mr. Namachivayam	57	M	55	64	9.89	14
6	Mr. Krruppiah	52	M	60	68	12.42	15.89
7	Mr.Natarajan	59	M	58	70	11	15
8	Mr.chandrakumar	42	M	52	69	14.14	17.89
9	Mr.Rajendran	46	M	62	74	12.36	16.55
10	Mrs.Bharathi	45	F	44	60	10.89	14.88
11	Mr.Sekar	43	M	46	58	14.02	18
12	Mrs.Uma	59	F	58	70	13.68	17
13	Mrs.Muthulakshmi	53	F	66	72	12.5	16.48
14	Mr. Veeraiyan	57	M	50	64	11.38	15.98
15	Mr.Ragu	53	M	54	68	12.02	15

Group B (Control Group)

Sl.No	Name	Age	Sex	Cadence before	Cadence after	Gait velocity before	Gait velocity after
				In steps	In steps	In meter / min	In meter / min
1	Mrs.Revathi	42	F	62	68	11	14.76
2	Mrs.Alamu	59	F	55	60	12.02	15
3	Mr.Chakravarthi	49	M	62	68	13.5	14.98
4	Mr.Kannan	56	M	44	45	11.76	13
5	Mr.Arumugam	56	M	46	60	10.46	14.02
6	Mrs.Vimala	42	F	58	66	14	15.26
7	Mr Kumar	55	M	62	68	12.56	13.98
8	Mr.Chandrasekar	52	M	50	58	13.59	16.55
9	Mr.Mathi	45	M	55	60	10.98	12.02
10	Mrs.Catherine	46	F	60	66	14.02	16.14
11	Mr.Nazeer	56	M	64	68	9.89	13.26
12	Mr.Thilaar	48	M	62	68	10.4	12.98
13	Mrs.seetha	58	F	44	55	14.22	16.58
14	Mr.Kumaresan	55	M	60	68	12.5	14.9
15	Mr.Adaikalam	60	M	55	62	11.38	13.20